REPORT OF SEDIMENTATION SURVEY

LAKE WEATHERFORD

Parker County, Texas

APRIL 1973

UNITED STATES
DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS

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Report of Sedimentation Survey

LAKE WEATHERFORD

Parker County, Texas

April 1973

United States Department of Agriculture

Soil Conservation Service

Temple, Texas

By

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TABLE OF CONTENTS

ILLUSTRATIONS AND TABLES

REPORT OF SEDIMENTATION SURVEY

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PARKER COUNTY, TEXAS

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INTRODUCTION

This report describes the results of a sedimentation survey of Lake Weatherford, Parker County, Texas, made by the United States Department of Agriculture, Soil Conservation Service, Temple, Texas, in cooperation with the City of Weatherford. The survey was made at the request of the Hood-Parker Soil and Water Conservation District and was accomplished during the period April 2 to May 1, 1973. No previous sediment investigations have been made prior to this survey.

GENERAL INFORMATION

The reservoir is owned and operated by the City of Weatherford for municipal and industrial water supply. The State Board of Water Engineers granted the city permission to impound 19,470 acre-feet of water and divert, annually, 4,500 acre-feet for municipal use and 1,500 acre-feet for industrial purposes.

Construction work began in June 1956, and the project was completed March 15, 1957. Deliberate impoundment of water began in March, and the lake was filled by early May, 1957. Diversion from the lake for municipal supply began in July, 1957.(6) In 1958 the city entered into an agreement with the Brazos Electric Power Cooperative Company whereby the latter was granted permission to install an electric power generating plant with a maximum output of 78,000 kilowatts. Under the agreement, the electric company is allowed to withdraw water for condenser cooling and general plant purposes. The water is returned from the condenser to the lake at a place to cause circulation, and the only consumption is by forced evaporation caused by heat added to the reservoir. The lake also serves as a fishing and recreational area.

PURPOSE OF SURVEY

1. To determine the capacity loss of the reservoir due to sedimentation.
2. To determine the distribution of sediment within the reservoir.
3. To determine the annual rate of sediment yield per unit of drainage area.
4. To determine the effects of conservation treatment and specifically the Clear Fork Trinity Watershed project on sediment yield to the reservoir.

LAKE WEATHERFORD SYSTEM

Location - Lake Weatherford is located approximately seven miles east of Weatherford, Parker County, Texas. The dam is constructed across the Clear Fork Trinity River, tributary to the Trinity River.

Description of Dam and Spillway - The earthen fill structure has a maximum height of 75 feet above the original streambed and is 4,055 feet long. The crown width, part of which is paved and serves as a park road, is 20 feet, and the maximum base width is 415 feet. The upstream embankment side slopes are 3:1 from the base to elevation 896.0 feet above mean sea level, and a slope of 2:1 upward to the top of dam, elevation 914.0 feet above msl. The downstream embankment side slopes are 3:1 from the base to elevation 874.0 feet above msl, 2.5:1 to elevation 894.0 feet above msl, and 2:1 upward to top of dam elevation 914.0 feet above msl. At each break in the downstream slope, a ten-foot berm occurs. The upstream face of the dam is protected by a 24-inch thick layer of limestone riprap placed on an eight-inch thick gravel blanket.

The service spillway consists of a semicircular, uncontrolled, concrete weir at elevation 896.0 feet above msl. Discharge is through a nine by nine-foot concrete conduit extending through the dam. The emergency spillway is located on the west end of the dam and is a two-level spill over a natural-earth section. A 500-foot crest length section is at elevation 903.0 feet above msl., and another 500-foot crest length section is at elevation 906.0 feet above msl. The low-flow outlet is an 18-inch, valve controlled, steel lined concrete pipe, which extends through the embankment.(6) The city water intake system is located on a pier extending into the lake from approximate station 28+50 centerline of dam. Water is pumped to Weatherford for treatment and distribution.

The Reservoir - Storage began in Lake Weatherford in the spring of 1957. The original surface area of the lake at service spillway crest elevation (896.0 feet above msl) was 1,144.94 acres, and the original capacity was 21,233.61 acre-feet as determined by this survey.

THE WATERSHED

General Description - The watershed originates in the northwest portion of Parker County, just touching southeast Jack and southwest Wise counties. Clear Fork Trinity flows diagonally from the northwest to the southeast across Parker County to Lake Weatherford. The distance of flow from the watershed divide to the dam is approximately 25 miles. Gourdneck Creek, Cottonwood Creek, and Carter Creek are major tributaries which join Clear Fork Trinity in the midportion of the watershed. Numerous short, straight branches complete the drainage pattern. The drainage area of the watershed is 109 square miles, or 69,760 acres.

Topography - The land surface varies from gently rolling to hilly with an elevation range of from 850 feet above msl to 1,375 feet above msl. Areas of pronounced relief occur where the resistant limestone beds cap the more erodible sandstone layers. Gullying is common in the sandstone, causing deep scars on the slopes. The flood plain is relatively narrow, and most of the drainage consists of short, steep, fairly straight tributaries.

Geology - The watershed of Lake Weatherford is underlain by the Paluxy Formation (86 percent), the Walnut Clay Formation (6 percent), and the Goodland Limestone formation (8 percent), all of Lower Cretaceous age. The Walnut Clay Formation occurs above the Paluxy and below the Goodland. The tops of most of the hills in the watershed are generally capped with outcrops of the Walnut and Goodland formations. Erosional remnants of the Kiamichi and Duck Creek formations are found capping a few of the higher elevations. These beds, where present, overlie the Goodland Limestone formation and account for less than one percent of the strata in the watershed. These formations are also of Lower Cretaceous age. All strata in the watershed dip slightly to the southeast at a rate of approximately 40 feet per mile.

Paluxy Formation

These beds are generally massive, poorly cemented, fine to very fine grained, sandstone. Locally, massive, lenticular beds of yellow, gray, green, and red claystone occur within the sandstone horizon. Both the sandstone and claystone strata are highly susceptible to erosion. Ravines and deep, narrow gullies are common.

Walnut Clay Formation

This formation consists of about equal amounts of clay and limestone. The limestone beds are easily recognized by the abundant presence of clam shell fossils. The clay beds are soft and less weather resistant, which results in bench-type topography where this formation outcrops.

Goodland Formation

These limestone and thin clay beds, which are more resistant to erosion than the underlying Paluxy Formation, cap the hills, forming flat to gently rolling topography.

Duck Creek and Kiamichi Formations

These formations, where present, occur above the Goodland Limestone beds which cap most hills in the watershed. Both are represented by thin limestone beds. The Duck Creek Formation is the uppermost formation.

Land Resource Areas and Soils - Two land resource areas occur in the watershed: the Cross Timbers and the Grand Prairie Land Resource Areas. The Cross Timbers Land Resource Area follows the outcrop of the Paluxy formation and occupies approximately 86 percent of the watershed. The remainder of the watershed lies within the Grand Prairie Land Resource Area. This area occurs as two narrow strips on either side of, and parallel to, the long axis of the watershed. These two strips are separated by the Cross Timbers Land Resource Area, which occupies the central portion of the watershed. The Grand Prairie Land Resource Area occurs above limestone which is found in the higher elevations.

The dominant soils in the watershed are of the Aledo, Duffau, Venus, Weatherford, and Windthorst series.

The Aledo series consists of very shallow, calcareous, clay loam soils that occupy gently sloping uplands. The soils are well drained and moderately permeable with medium to high runoff characteristics. These soils are underlain by limestone and are used for rangeland.

The Duffau series consists of deep loamy or sandy soils formed in strata of the poorly cemented Paluxy Formation. These soils occupy gently sloping to sloping erosional upland areas and high stream terraces. Slope gradients vary from 1 to 8 percent. The soils are well drained and moderately permeable with slow to rapid runoff characteristics. They were once extensively cultivated, but are now used mostly for pasture.

The Venus series consists of deep, calcareous, loamy soils which occupy nearly level to sloping stream terrace areas. They are well drained and moderately permeable, with medium to slow runoff characteristics. These soils are used, primarily, to grow small grains.

The soils of the Weatherford series are deep, loamy soils which occupy gently sloping to sloping upland areas. They are moderately permeable and well drained, with slow to medium runoff characteristics. These soils formed in the poorly cemented Paluxy Formation and are used principally for pasture and rangeland.

The soils of the Windthorst series occupy erosional upland settings. Dominant slope gradients average 4 percent, but range from 1 to 8 percent. The soils are moderately deep with moderate to rapid runoff characteristics. These soils were once extensively cultivated, but are now mostly used for pasture. Some of the gently sloping areas are still planted to small grains. Erosion, in the form of gullying, is a problem in the steeper areas. The soils formed in clayey sediments and poorly cemented sandstone.

Climate - The climatic classification for the watershed is moist-subhumid. The average annual rainfall is 31.97 inches, well distributed over the growing season, which is 225 days. The heaviest rainfall generally occurs in the months of April, May, June, and October. August has the lowest average monthly rainfall with 1.67 inches. The mean annual temperature is 64° with a range of from 44° F to 83° F.

The average annual gross lake surface evaporation is approximately 72 inches, and the net lake surface evaporation is approximately 41 inches per year.(5)

The mean annual runoff is 3.88 inches, or 22,554 acre feet.(7)

Erosion and Sediment Yield - Detailed sediment source studies were made to determine the annual gross erosion in the watershed. These studies included mapping land use; cover conditions on range and pasture lands; and length, width, depth, and estimated annual lateral erosion of gullies, streambanks, and roadside ditches. Soils information in the form of soil

unit, slope in percent, and slope length in feet was obtained from the Soil Conservation Service field office located in Weatherford.

Separate studies were made based upon land use, cover conditions, and conservation practices in effect at the beginning of the reservoir operation and under present conditions.

In estimating average annual gross erosion, the quantity of material derived from sheet erosion and channel erosion was computed separately. Sheet erosion was computed by use of the Musgrave equation.(3) Channel erosion was computed by a formula described by Renfro.(4)

Under 1957 conditions, the estimated average annual gross erosion from all sources was 286 acre-feet. At the date of the survey, the majority of the land treatment and conservation practices provided for in the Clear Fork Watershed Work Plan have been established. As a result, the average annual gross erosion has been lowered to a present quantity of 200 acre-feet, a reduction of about 30 percent.

The combined program of conservation treatment and structural measures have reduced the average annual sediment yield to Lake Weatherford to a quantity of 35 acre-feet, a reduction of approximately 65 percent.

The reservoir has an estimated trap efficiency of 97 percent.(1) The density of submerged sediment is 38 pounds per cubic foot as compared to a density of 92 pounds per cubic foot for in-place soil, a ratio of 2.42 to 1. By applying these factors to the 35 acre-feet sediment yield, the average annual capacity loss due to sediment deposition is found to be 85 acre-feet.

Comparing the average annual erosion to the average annual yield reveals a sediment delivery ratio of 35 percent.

Land Use - The following tabulation shows the land use in the watershed at the time of the survey:

Land Use	Acres	Percent
Rangeland	36,962	53.0
Pastureland	16,732	24.0
Cultivated	10,457	15.0
Lake Area	1,145	1.6
Miscellaneous*	4,464	6.4
Total	69,760	100.0

*Includes highways, roads, etc.

SURVEY METHODS AND CALCULATIONS

The latest date aerial photographs, furnished by the City of Weatherford, were utilized in making the survey. Range lines were marked on the photographs which were, in turn, located and staked on the ground. The City agreed to install permanent range end markers after conclusion of the survey.

The following survey procedures were used:

1. Starting from a U. S. Geological Survey bench mark set in concrete located on the municipal pump station pier, a line of levels was run to temporary bench marks along the lake shoreline. Elevations were then taken from the temporary bench marks to the water surface and then to the range ends by use of a dumpy level.

2. A steel airplane cable was then stretched from shore to shore, on line, between range ends. Plastic jugs were attached to the cable at 200 to 300-foot intervals to keep the cable near the water surface so as to facilitate tightening and prevent snagging on the lake bottom. A boat with line meter was then attached to the cable. Patrol boats, furnished by the City, were stationed on either side of the cable to warn lake traffic of the presence of the cable.

3. As the boat moved along the cable, distances were recorded. Water depths and sediment thickness measurements were made at regular intervals between range ends.

4. Water depths were measured with a standard 5-pound conical-shaped pea attached to a copper-cored, graduated sounding line. Sediment thickness was measured using a grooved spud bar and sounding poles.

5. Sediment samples were obtained using a nine-foot piston-type sampler which employs a clear plexi-glass tube insert, which allows visual examination of all samples. See figure 1 for sampling locations.

Approximately 1,500 measurements were made on the 19 ranges. Original and present capacities were calculated, using the prismoidal formula as described by Eakin.(2)

Plottings of range cross sections showing original and present bottom elevations are shown in figure 2.

SEDIMENTATION IN THE RESERVOIR

Character of Sediment - Six sediment samples were taken from the reservoir. None of the samples contained more than 26 percent sand. All samples contained at least 74 percent particles finer than 0.074 millimeters. Three samples from the mid and lower portions of the reservoir contained, on the average, particles 87 percent finer than 0.002 millimeters. The two samples which contained any appreciable sand grain

size particles came from the mid and upper reaches of the reservoir. The average dry weight of sediment in the reservoir is 38 pounds per cubic foot. The sediment ranges from gray to tan in color.

Distribution of Sediment - Sediment deposition in the reservoir is fairly uniform over two-thirds of the reservoir area. In the upper one-third of the reservoir area, segments 14 through 18, capacity loss ranges from 10.37 to 31.47 percent. Capacity loss in the lower two-thirds of the reservoir area ranges from 1.42 percent in segment 1 to 8.54 percent in segment 13, an average of 5.44 percent. Overall capacity loss for the entire reservoir is 6.44 percent, or an average annual capacity loss of 0.40 percent for the 16.08-year life of the reservoir.

Volume Weight of Sediment - All sediment samples were taken from areas of the reservoir which have been continually submerged. Laboratory analysis of the samples by the Soil Conservation Service Materials Testing Section at Fort Worth, Texas revealed an average dry unit weight of 38.15 pounds per cubic foot. The samples ranged in weight from 20.9 to 58.7 pounds per cubic foot. The average dry unit weight of upland soils is 92 pounds per cubic foot.

SOIL CONSERVATION

Conservation treatment on land in the watershed is carried out under the direction of the Hood-Parker Soil and Water Conservation District assisted by the Soil Conservation Service field office in Weatherford. This effective conservation program is based upon the use of each acre of agricultural land within its capabilities and treatment in accordance with its needs. The Soil Conservation Service field office has helped farmers and ranchers in preparing soil and water conservation plans on 41,856 acres, or 60 percent of the watershed of Lake Weatherford. They have furnished technical assistance in establishing and maintaining the planned measures. To date, approximately 81 percent of the land treatment measures have been applied. Some conservation treatment has been applied to most land not under cooperative agreement.(8)

Land treatment measures have decreased erosion and sediment production from cropland, rangeland, and pastureland by improved soil-cover conditions. Brush control on range and pastureland, conversion of formerly cultivated land to pasture, and proper crop rotation have had a measurable effect in reducing erosion damage and sediment yield.

The Clear Fork Trinity River Watershed project, which encompasses the entire drainage area above Lake Weatherford, has had a marked effect in reducing sediment yield to the lake. Twenty-two floodwater retarding structures, controlling 45.94 square miles, have been constructed above Lake Weatherford. These structures effectively control runoff from approximately 42 percent of the total drainage area above Lake Weatherford. Land treatment measures and conservation practices have reduced the gross erosion in the drainage area by 30 percent. As a result of this program, combined with the structural measures, sediment yield to Lake Weatherford has been reduced by 65 percent. This results in increasing the useful life of the reservoir by approximately 163 percent or to over 200 years.

SUMMARY

As shown by the Reservoir Sediment Data Summary Sheet, table 1, the reservoir has lost 1,368 acre-feet of its original capacity due to sedimentation during the 16 years since construction. The average annual rate of deposition is 85 acre-feet, a rate of 1.35 acre-feet per square mile of net watershed drainage area.

The total capacity loss of the reservoir to date is only 6.44 percent, an average annual rate of 0.40 percent. The greatest capacity loss occurs in the upper reaches of the lake where the water is restricted to the stream channel and narrow adjacent flood plain area.

Conservation treatment measures by farmers and ranchers and the Clear Fork Watershed Project have reduced sediment yield to the reservoir by 65 percent, thereby increasing the useful life by approximately 163 percent or to over 200 years.

REFERENCES

1. Brune, G. M., Trap Efficiency of Reservoirs, Trans. American Geophys. Union, Vol. 34, No. 3, pp 407-418, June 1953.

2. Eakin, H. M., Silting of Reservoirs, U. S. Dept. of Agriculture Tech. Bull. 524 (Revised by C. B. Brown), 166 pp. illus., 1939.

3. Musgrave, G. W., The Quantitative Evaluation of Factors in Water Erosion - A First Approximation, Journal of Soil and Water Conservation, Vol. 2, No. 3, pp 133-138, July 1947.

4. Renfro, G. W. and Moore, C. M., Sedimentation Studies in the Western Gulf States, Proceedings, ASCE, Hydraulics Div., October 1958.

5. Texas Board of Water Engineers Bulletin 6006, Monthly Reservoir Evaporation Rates for Texas, 1960.

6. Texas Water Development Board Report 48, Dams and Reservoirs in Texas, June 1967.

7. U. S. Dept. of Agriculture, Soil Conservation Service, Average Annual Runoff Map, 1954.

8. Yoder, Emmitt W., Unpublished Data from District Conservationist, U. S. Dept. of Agriculture, Soil Conservation Service, Weatherford, Texas.

RESERVOIR SEDIMENT DATA SUMMARY
SCS-34 Rev. 6-66

TABLE 1

Lake Weatherford
NAME OF RESERVOIR

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

51 -25
DATA SHEET NO.

DAM

1. OWNER City of Weatherford	2. STREAM Clear Fork of Trinity	3. STATE Texas
4. SEC. TWP. RANGE	5. NEAREST P. O. Weatherford	6. COUNTY Parker
7. LAT. N 32 46'15" LONG. W 97 40' 38"	8. TOP OF DAM ELEVATION 914.0	9. SPILLWAY CREST ELEV. 896.0

RESERVOIR

10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. ORIGINAL SURFACE AREA, ACRES	13. ORIGINAL CAPACITY, ACRE-FEET	14. GROSS STORAGE, ACRE-FEET	15. DATE STORAGE BEGAN
a. FLOOD CONTROL					March 1957
b. MULTIPLE USE					
c. POWER					
d. WATER SUPPLY	896.0	1144.94	21,233.61	21,233.61	16. DATE NORMAL OPER. BEGAN
e. IRRIGATION					
f. CONSERVATION					July 1957
g. INACTIVE					

WATERSHED

17. LENGTH OF RESERVOIR	3.5 MILES	AV. WIDTH OF RESERVOIR	0.65 MILES
18. TOTAL DRAINAGE AREA	109 SQ. MI.	22. MEAN ANNUAL PRECIPITATION	31.97 (86) INCHES
19. NET SEDIMENT CONTRIBUTING AREA	63.06 1/ SQ. MI.	23. MEAN ANNUAL RUNOFF	3.88 INCHES
20. LENGTH 20 MILES	AV. WIDTH 5.45 MILES	24. MEAN ANNUAL RUNOFF	22,554.32 AC.-FT.
21. MAX. ELEV. 1375.0	MIN. ELEV. 855.0	25. ANNUAL TEMP.: MEAN 64°F	RANGE 44°F - 83°F

SURVEY DATA

26. DATE OF SURVEY	27. PERIOD YEARS	28. ACCL. YEARS	29. TYPE OF SURVEY	30. NO. OF RANGES OR CONTOUR INT.	31. SURFACE AREA, ACRES	32. CAPACITY, ACRE-FEET	33. C/I. RATIO, AC.-FT. PER AC.-FT.
3-57	-	-			1144.94	21,233.61	1.57 2/
4-73	16.08	16.08	Range (D)	19 Ranges	1144.94	19,865.72	1.47 2/

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-FT.	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE

26. DATE OF SURVEY	37. PERIOD CAPACITY LOSS, ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YEAR
4-73	1367.89	85.07	1.35	1367.89	85.07	1.35

26. DATE OF SURVEY	39. AV. DRY WGT., LBS. PER CU. FT.	40. SED. DEP., TONS PER SQ. MI.-YR.		41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANN.	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DATE
4-73	38.15 (6)	1121.67	1121.67	0.40	6.44	-	-

26. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION											
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION											

26. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	-105	-110	-115	-120	-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION														

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC.-FT.

46. ELEVATION–AREA–CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY

47. REMARKS AND REFERENCES

1/ Does not include 44.15 sq. mi. drainage area controlled by 22 SCS floodwater retarding structures, and 1.79 sq. mi. lake area.

2/ Adjusted because of upstream control of 22 SCS floodwater retarding structures.

Land Use: Rangeland 53%, Pastureland 24%, Cultivated Land 15%, Miscellaneous 8%.

Physiographic Area: West Cross Timbers

Estimated Trap Efficiency = 97%

Geology - Paluxy Formation 86%, Walnut Formation 6%, Goodland Limestone 8%. All Lower Cretaceous Age.

48. AGENCY MAKING SURVEY Soil Conservation Service

49. AGENCY SUPPLYING DATA Temple, Texas

50. DATE 6-73

TABLE 2
SEGMENT DATA
1973 Sedimentation Survey
Lake Weatherford

Segment Number	Area (Acres)	Original Capacity (Ac-Ft)	Capacity at Date of Survey (Ac-Ft)	Sediment Volume (Ac-Ft)	Capacity Loss (Percent)
1	55.97	1423.52	1403.34	20.18	1.42
2	87.30	2618.33	2479.72	138.61	5.29
3	106.53	3161.41	2992.21	169.20	5.35
4	92.36	2264.84	2148.30	116.54	5.15
5	74.53	1721.58	1616.63	104.95	6.10
6	81.31	1763.76	1654.19	109.57	6.21
7	77.22	1475.83	1392.58	83.25	5.64
8	70.57	1198.99	1164.35	34.64	2.89
9	40.65	668.91	646.87	22.04	3.29
10	37.45	570.83	532.65	38.18	6.69
11	43.82	680.66	634.69	45.97	6.75
12	62.02	914.32	846.86	67.46	7.38
13	52.78	710.69	649.99	60.70	8.54
14	50.51	588.57	527.53	61.04	10.37
15	69.79	636.17	549.92	86.25	13.56
16	77.30	578.43	451.31	127.12	21.98
17	27.59	142.70	96.41	46.29	32.44
18	37.24	114.07	78.17	35.90	31.47
Totals:	1144.94	21,233.61	19,865.72	1367.89	6.44

TABLE 3

Lake Weatherford
1973 Sedimentation Survey - Present Capacity
Elevation - Area - Volume Tables

Elevation	Area (Acres)	Capacity (Acre-Ft)
855.0	16.70	43.27
860.0	52.33	221.98
865.0	107.55	636.26
870.0	229.43	1509.43
875.0	368.94	3059.89
880.0	571.33	5496.26
885.0	780.47	8998.96
890.0	938.91	13,454.11
895.0	1088.72	18,707.97
896.0	1144.94	19,865.72


To Weatherford
Farm Road 1701
Farm Road 1721
To Azle
Fence Plant
Emergency Spillway
E. Dam
Service Spillway El 852.0 Ft
Municipal Pump Station USGS BM El 837.81 Ft
Clear fork of Trinity
E. Dam
TBM No 1 El 837.30
White Settlement Rd
LEGEND
R-10 R-2 SEDIMENTATION RANGE LINE
1 SEGMENT NUMBER
SAMPLE TAKEN
0 500 1000 1500 2000
SCALE IN FEET
Top of Dam Elevation 873.3 Ft
Emergency Spillway Crest (upper level) 858 Ft
Emergency Spillway Crest (lower level) 848 Ft
Normal Operating Level 836 Ft
Drainage Area (Acres) 65,740
(Legend)
SEGMENT MAP
SEDIMENTATION SURVEY - 1973
LAKE WEATHERFORD
IN
PARKER COUNTY, TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed
Drawn B.J. & V.C. 6-73
Traced S. 6-73
Checked
Approved by
Date
Drawing No. 4-R-33,106-S
Revised 1-25-76
Revised 2-14-75

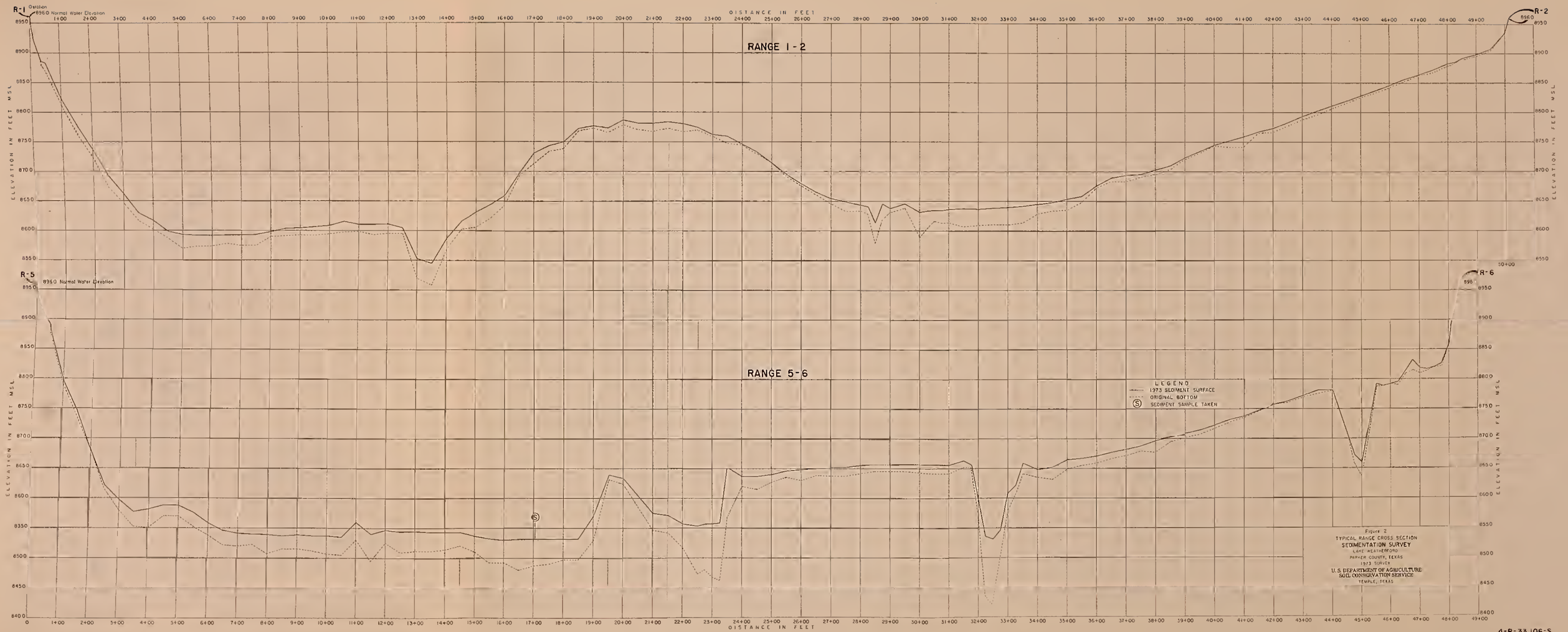
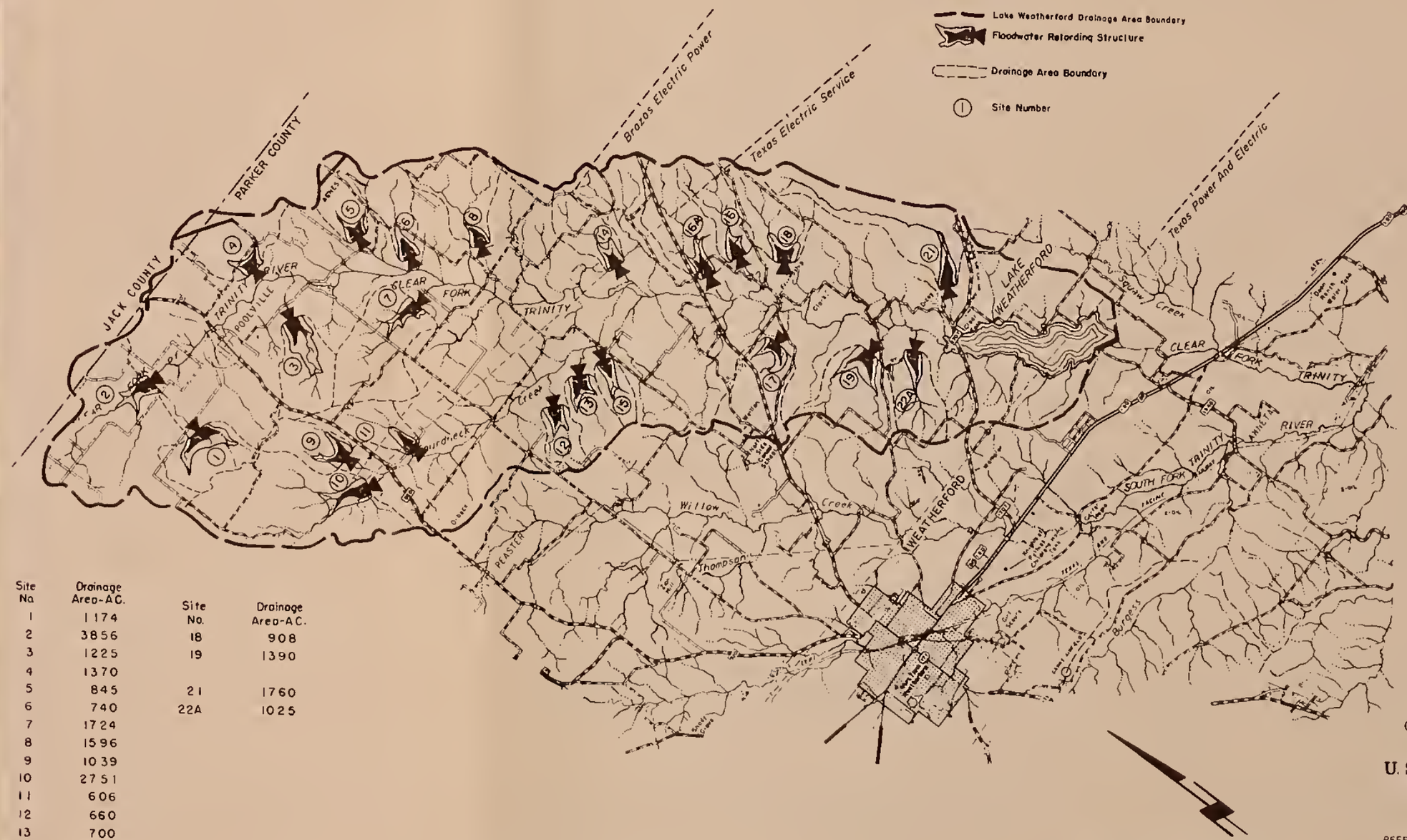


Figure 2
TYPICAL RANGE CROSS SECTION
SEDIMENTATION SURVEY
LAKE WEATHERFORD
PARKER COUNTY, TEXAS
1973 SURVEY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS

4-R-33,106-S



Site No	Drainage Area-AC.	Site No.	Drainage Area-AC.
1	1174	18	908
2	3856	19	1390
3	1225		
4	1370		
5	845	21	1760
6	740	22A	1025
7	1724		
8	1596		
9	1039		
10	2751		
11	606		
12	660		
13	700		
14	832		
15	652		
16	1056		
16A	1255		
17	1092		

Total Drainage Area 69,760 Acres
Total Area Controlled By Floodwater Retarding Structures 28,256 Acres

Figure 3
DRAINAGE AREA
LAKE WEATHERFORD
PARKER COUNTY, TEXAS
IN THE
CLEAR FORK OF THE TRINITY RIVER
WATERSHED

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE TEXAS

REFERENCE

CARTOGRAPHIC APPROVAL — TECHNICAL APPROVAL

COMPILED — TRACED — CHECKED — DATE
F.I.B.

FEBRUARY 1975 4-R-34,700